

Projected Climate Change, Potential Impacts and Associated Risks

Section B continued: Impacts Guiding AMBITION and
CHOICES in Mitigation and Adaptation



Impacts of global warming: Where do we want to go?

At 1.5°C compared to 2°C:

- Less impacts from extreme weather where people live
- By 2100, global mean sea level rise will be around 10 cm lower but will continue to rise for centuries
- 10 million fewer people exposed to risk of rising seas (...less coastal ecosystems exposed)

Jason Florio / Aurora Photos

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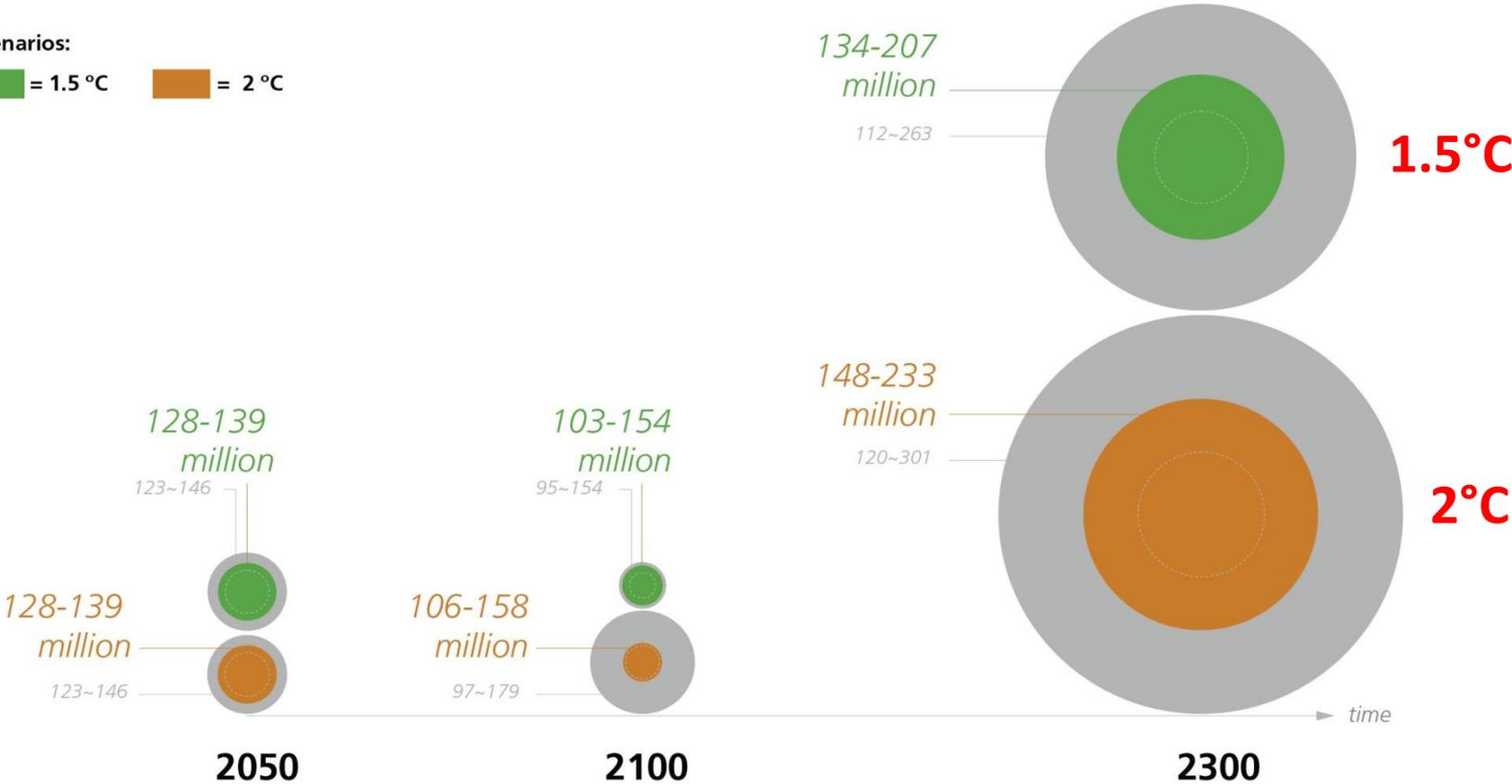
INTERGOVERNMENTAL PANEL ON climate change



People exposed to Sea Level Rise, assuming there is no adaptation or protection

Scenarios:

■ = 1.5 °C ■ = 2 °C



Upper values correspond to the 50th percentile; values below correspond to the 5th to 95th percentile range



Where do we want to go?

At 1.5°C compared to 2°C:

- Lower impact on biodiversity and species
- Smaller reductions in yields of maize, rice, wheat crop yields
- Global population exposed to water shortages is up to 50% less (also less water shortages for ecosystems)



Andre Seale / Aurora Photos

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SPM 1.5°C: Terrestrial biodiversity

- Of 105,000 species studied, 6% of **insects**, 8% of **plants** and 4% of **vertebrates** are projected to **lose over half of their climatically determined geographic range** for global warming of 1.5°C, **half of the respective numbers at 2°C**.
- Approximately 4% (interquartile range 2–7%) of the global **land area** is **projected to undergo a transformation of ecosystems from one type to another** at 1°C of global warming, compared with 13% (interquartile range 8–20%) at 2°C. This indicates that the area at risk is projected to be approximately **50% lower at 1.5°C compared to 2°C**.

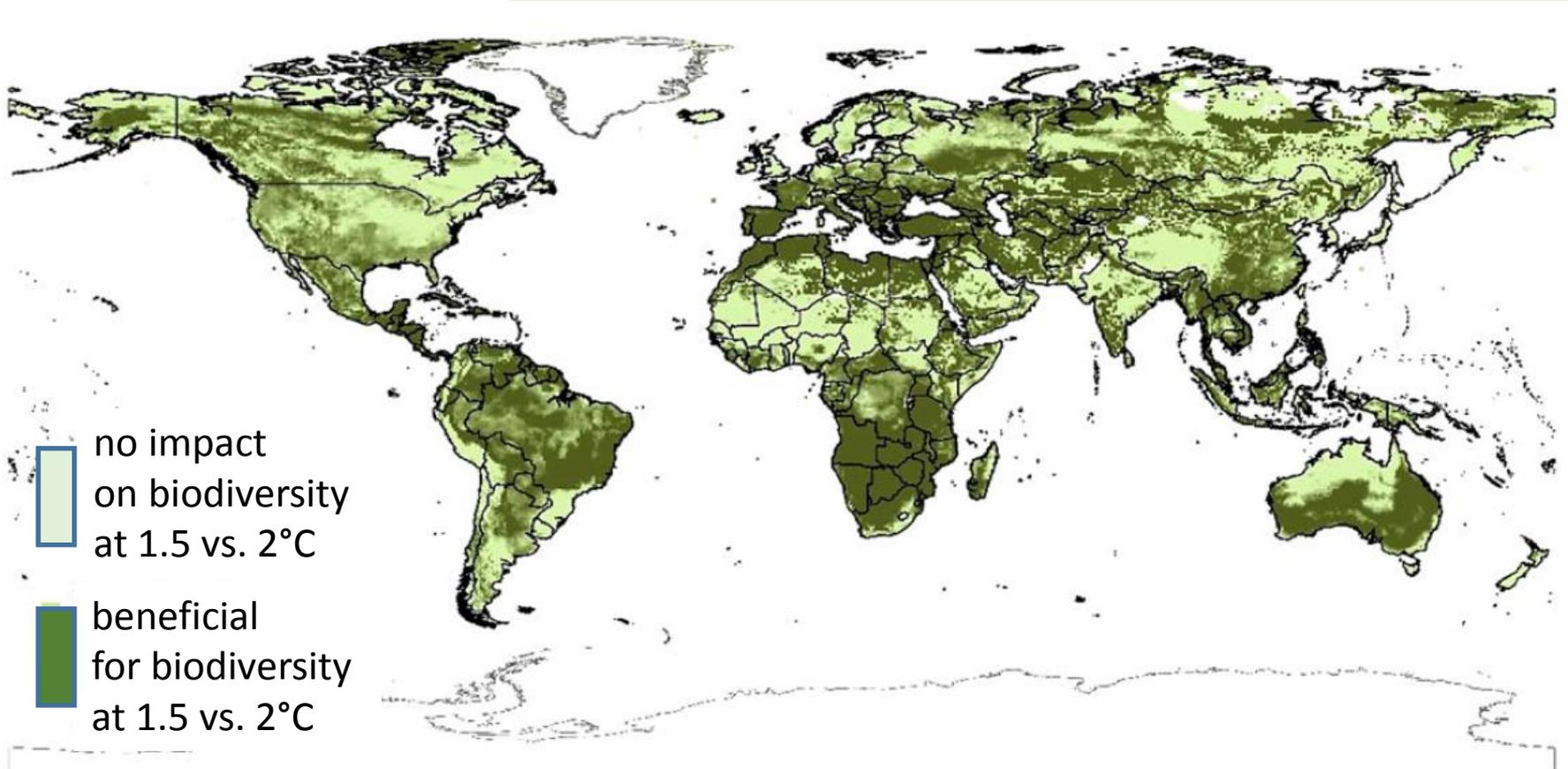
Terrestrial biodiversity

P. Smith et al. 2018

Where do we want to go?

At 1.5°C compared to 2°C:

- Lower impacts on biodiversity and species



Terrestrial Meta-analysis as in SR1.5

ILLUSTRATIVE EXAMPLE

Where do we want to go?

At 1.5°C compared to 2°C:

- Up to several hundred million fewer people exposed to climate-related risk and susceptible to poverty by 2050
- Lower risk to fisheries & the livelihoods that depend on them



Natalie Behring / Aurora Photos



Where do we want to go?

At 1.5°C compared to 2°C:

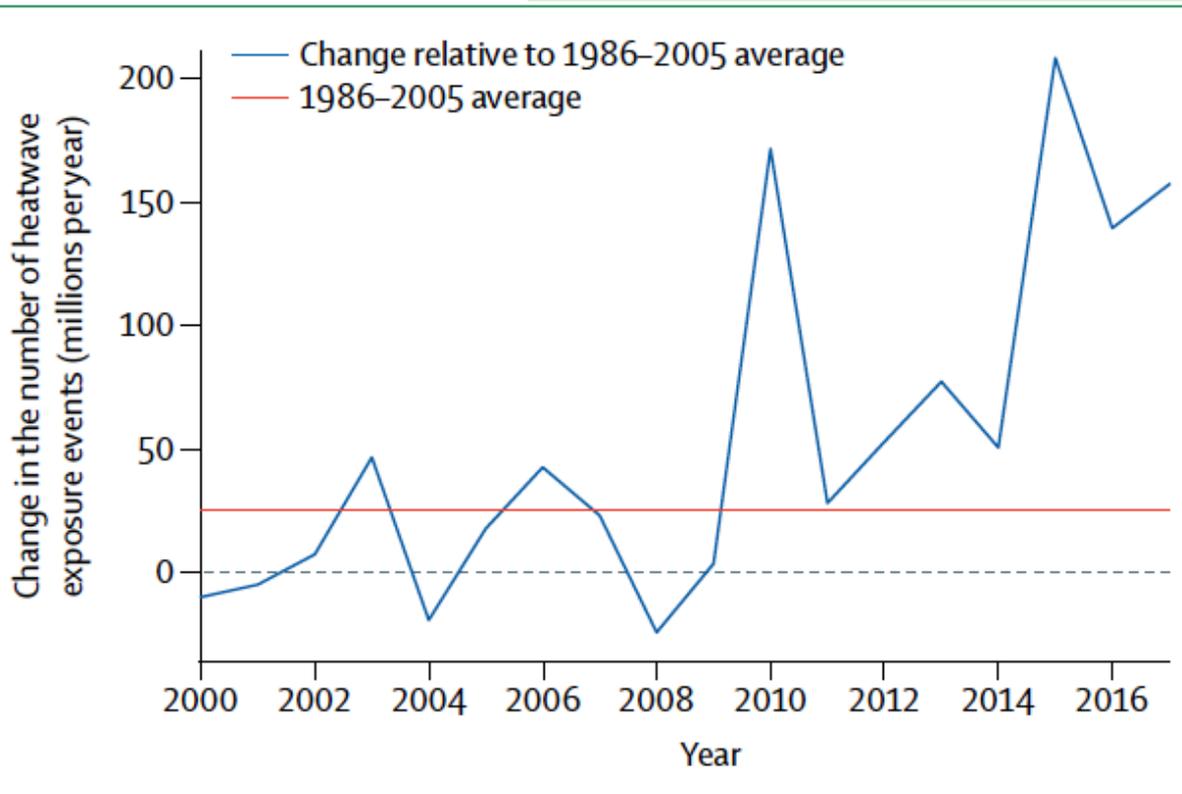
- Disproportionately high risk for Arctic, dryland regions, small island developing states and least developed countries
- Lower risks for health, livelihoods, food security, water supply, human security and economic growth
- A wide range of adaptation options can reduce climate risks; less adaptation needs at 1.5°C

Jason Florio / Aurora Photos

Where do we want to go?

At 1.5°C compared to 2°C:

- Reduced risk to human health – lower heat-related morbidity and mortality

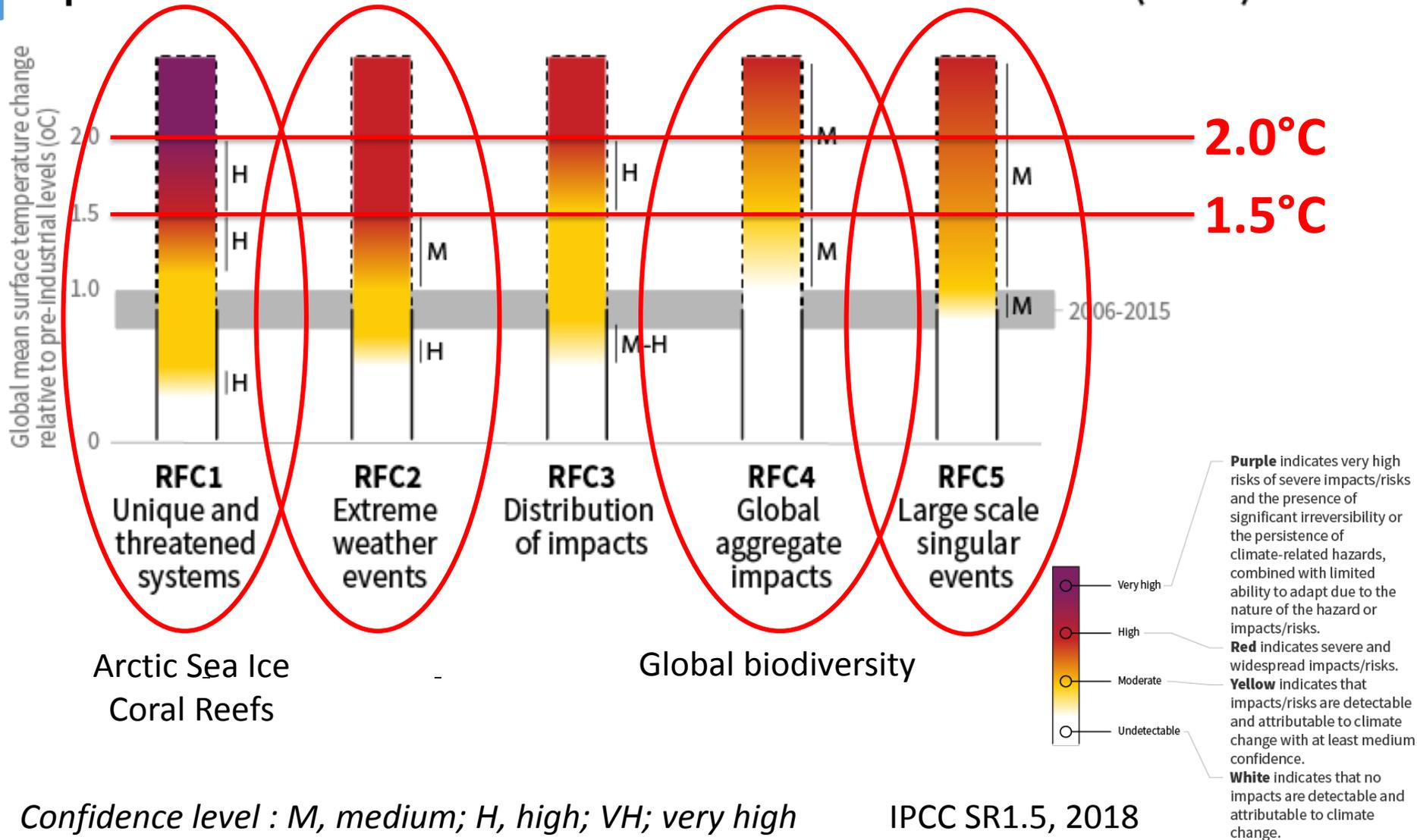


... on a rise linked to strengthened increase in heat wave exposures...

(Lancet 2018)

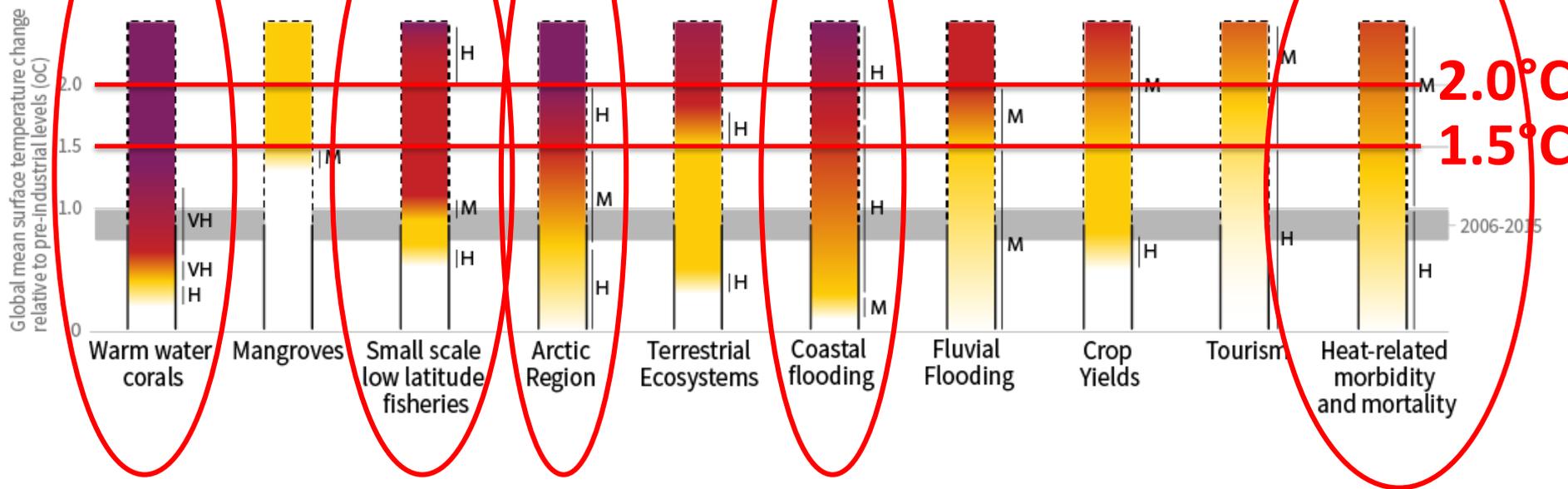
ILLUSTRATIVE EXAMPLE, TO BE ASSESSED IN AR6

Impacts and risks associated with the Reasons for Concern (RFCs)



*...half a degree matters... every bit of warming matters...
 ... for ecosystems, biodiversity and humankind*

Impacts and risks for selected natural, managed and human systems



...less loss and damage at 1.5°C

Confidence level : M, medium; H, high; VH; very high

IPCC SR1.5, 2018



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OBSERVATIONS

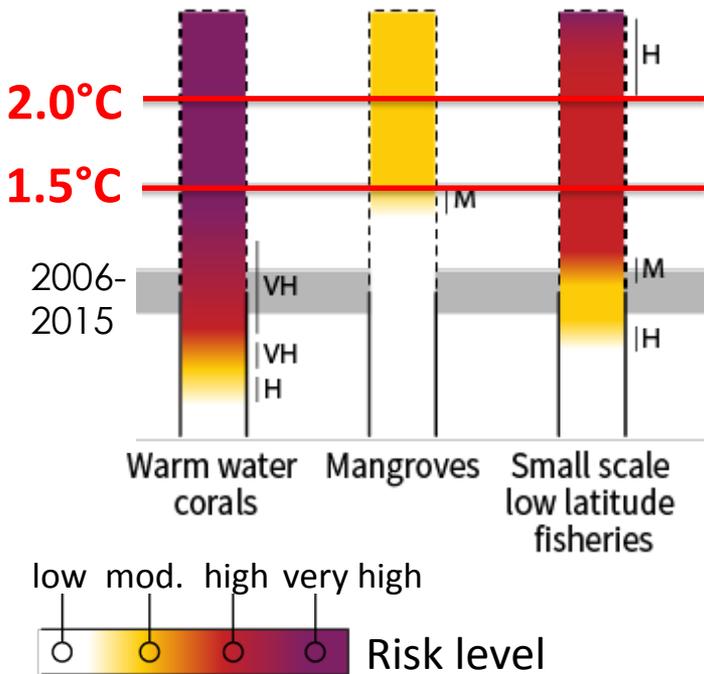
0.8 to 1.0°C



Vulnerable ecosystem identified in AR5 and SR1.5

Warm water coral reefs under various pressures

Assessing risk of global warming



Even in a 1.5°C warmer world... high risk of losing 70 to 90% of coral reefs and their services to humankind; ... even higher losses at 2°C

2016

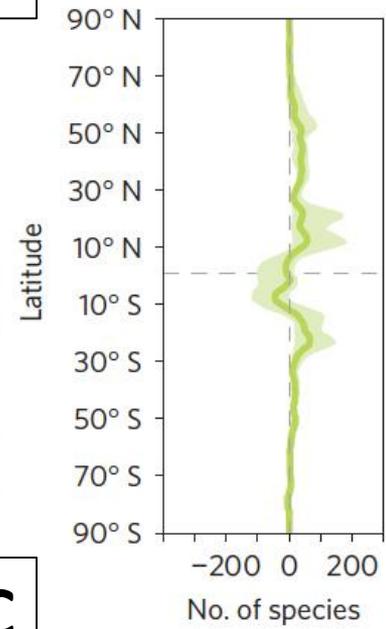
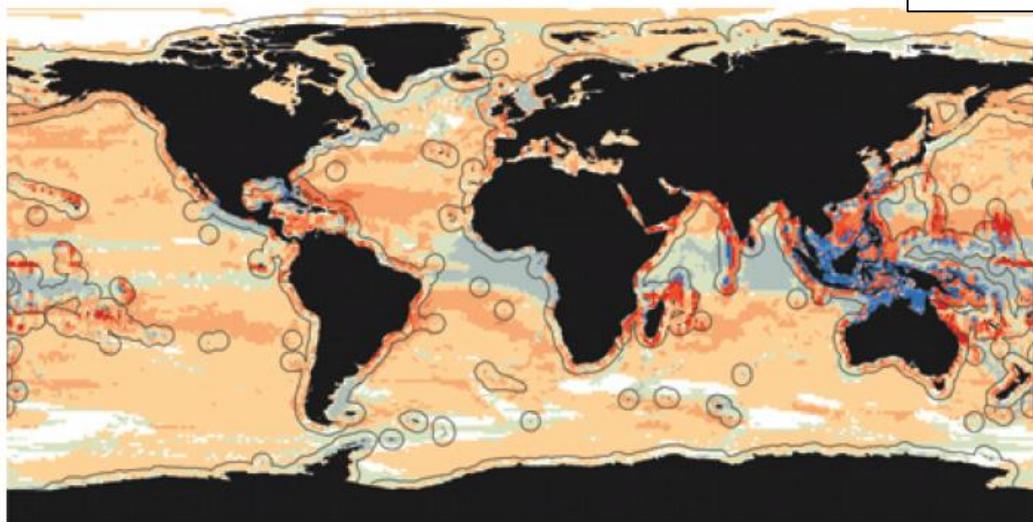
Drivers of change: **Warming and velocity....**

+2°C

AR5: Marine biodiversity

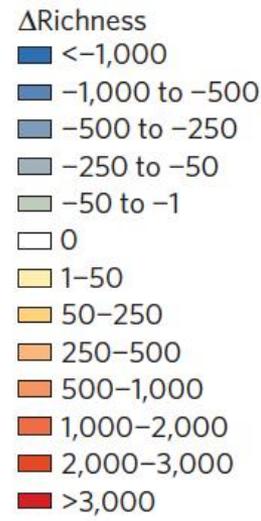
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ΔN° RCP4.5 (2006-2100)



RCP 4.5

Garcia-Molinos et al. 2015, 2017 NCC



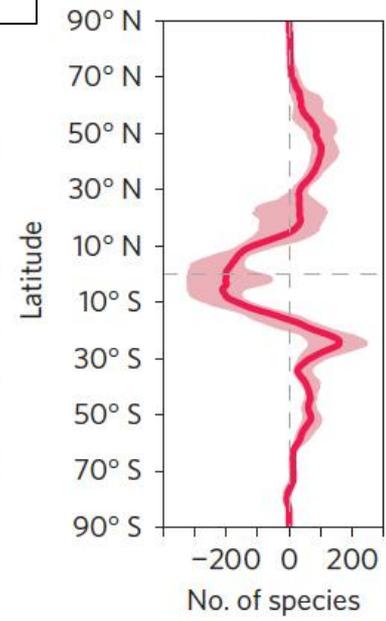
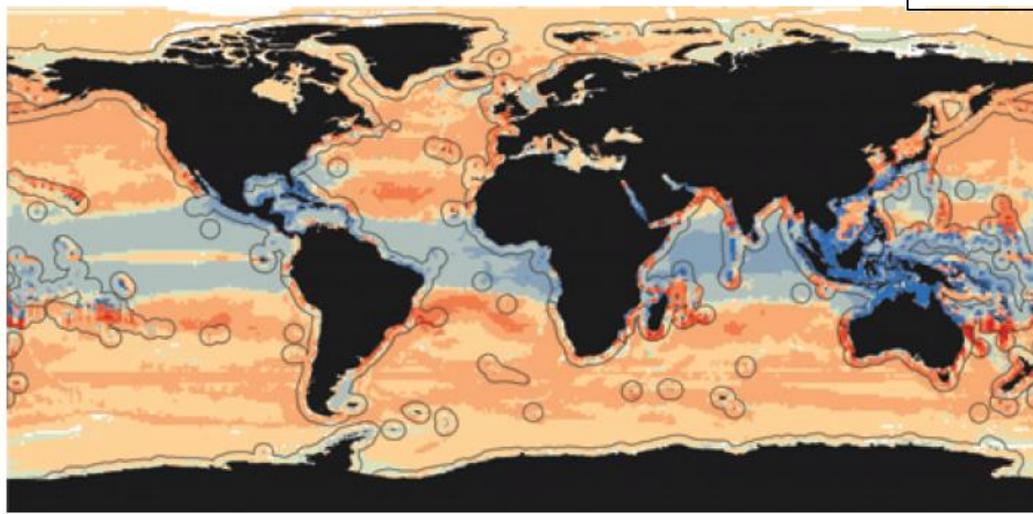
RCP4.5 versus 8.5

Ultimate Species Heat Limits surpassed in Tropics

+4°C

c

ΔN° RCP8.5 (2006-2100)



RCP 8.5

Large changes in community composition expected driven by local invasions and losses

ILLUSTRATIVE EXAMPLE

Vulnerable ecosystems identified in AR5 and SR1.5:

Arctic summer sea ice systems

1.5°C

≥2°C

RCP 2.6
ambitious mitigation

RCP 8.5
business as usual

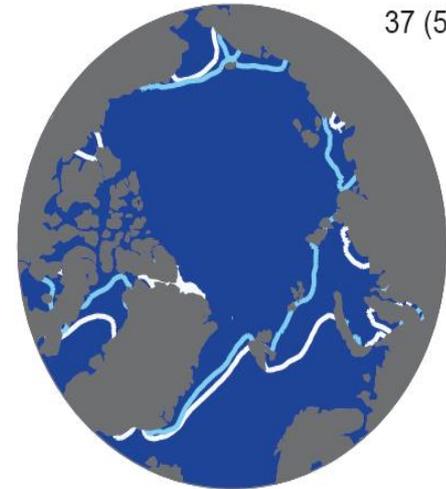
Northern Hemisphere September sea ice extent (average 2081–2100)

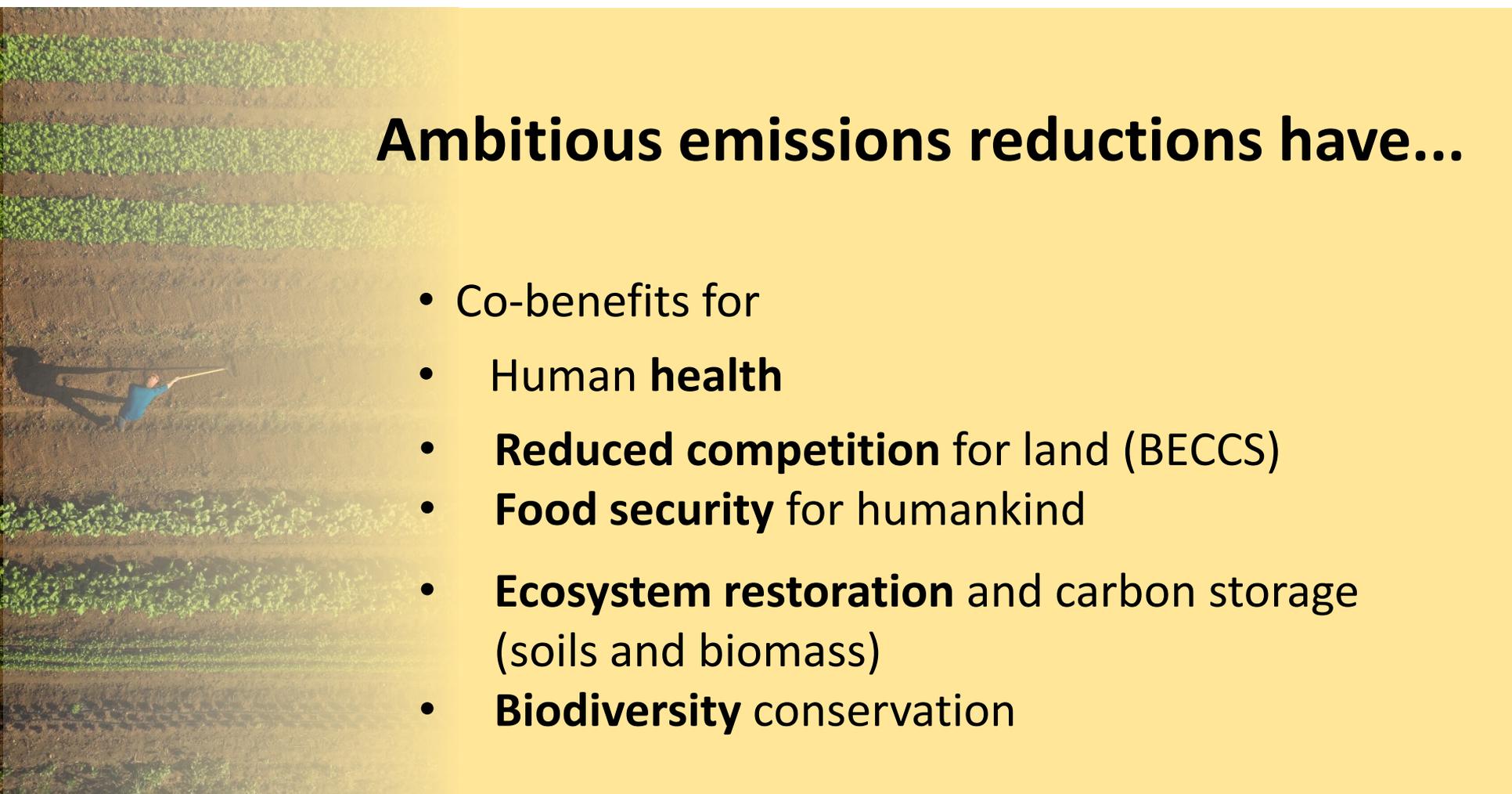
**1 in 100 years
ice-free
at 1.5°C**



- CMIP5 multi-model average 1986–2005
- CMIP5 multi-model average 2081–2100
- CMIP5 subset average 1986–2005
- CMIP5 subset average 2081–2100

37 (5) **> 1 in 10
years ice-
free at
2°C**





Ambitious emissions reductions have...

- Co-benefits for
- Human **health**
- **Reduced competition** for land (BECCS)
- **Food security** for humankind
- **Ecosystem restoration** and carbon storage (soils and biomass)
- **Biodiversity** conservation

For minimizing impacts and associated risks....

Half a degree...,

...every bit of warming matters

Each year matters

Each choice matters



Ashley Cooper/ Aurora Photos